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certain proportion of his land in rye. In Norway the polar limit of summer rye is about 69° , and that of winter rye about 61° ; but in Sweden it has been carried along the coast as far north as 65° . The summer rye-crops are generally sown and fit for cutting about the same time as barley, although occasionally in southern Norway less than ninety days are required for their full maturity.

CASSINO'S STANDARD NATURAL HISTORY.

THE editors of the 'Standard natural history' have undertaken a most difficult and praiseworthy work. The aim set in the prospectus is to give "a popular account of the whole animal kingdom by the best American authorities," and American forms are to be made especially prominent. Mr. J. S. Kingsley is editor-in-chief, and each type or class is described by some naturalist who has made special investigations in that group. The work is to be completed in six imperial octavo volumes. Of these, two treat of invertebrates, three of vertebrates except man, and the sixth of the human races. Three of them have already been completed.

It is a labor requiring no small study and diligence to collate the immense mass of terribly scattered notes and articles on American zoölogy. But the great danger is, of course, that the work will be too abstruse for popular use, or too popular for scientific accuracy and value. Both these extremes have been uniformly avoided by the different writers with a skill hardly to be expected, and worthy of all praise. There is, too, no such lack of unity or uniformity as one would expect from so large a corps of editors. The figures are remarkably clear and fine. Indeed, the first question that occurs to us is whether some of the luxury in heavy paper, wide margins, and striking full-page cuts, might not well have been dispensed with in order to lower the price of the work, and give it the circulation which it deserves: for to many young students, and teachers in our schools and academies, this work would be the very best help; and yet to them especially the price, six dollars a volume, will be an insuperable obstacle.

The introduction, which occupies seventy pages of the first volume, opens with an account of protoplasm and the cell. In the whole introduction only five pages are devoted to embryonic development. This subject is treated

under each group in the systematic portion of the work only in a general and very meagre outline. This is perhaps wise in a popular work, but for that very reason it should have been described in the introduction as fully as is consistent with a purely general outline. Twenty pages are devoted to the nervous system and animal psychology, forming a brief but admirable epitome of what is known of this as yet almost unexplored field. The single page devoted to alternation of generations and parthenogenesis is the least satisfactory in the introduction: the statement is meagre, the line of argument any thing but clear. Evolution is discussed in twelve pages, six of which are devoted to a history of the theory and *résumé* of the contributions of American students. It is certainly one of the most marked defects of the work, that this subject of universal and intense interest should not have been fully presented; all the more, because the age, investigations, and views of the writer fitted him to give us a fair and impartial discussion of the subject.

Of the systematic portion of the first volume, one can but notice the generally high character of the work. It does great credit to its editors. Especial notice should perhaps be given to the interesting discussion of the origin and formation of coral islands. The editor of the chapter on Vermes, the most difficult and least familiar branch, has given too little of the anatomy, and has hardly attempted to show the resemblance and affinities between the different classes. It is certainly a pity that the Brachiopoda, which have so many points of interest, should be dismissed with only three pages. Their enormous abundance in early geologic ages, together with the long battle so hotly waged over their affinities and systematic position, should gain for them more attention, and the more so that this conflict originated through the writings of an American naturalist. Even some of their most important anatomical characteristics are not stated; and of their great geological importance as the predecessors of Mollusca, we have scarcely a hint. But, if the introduction and the description of all the invertebrates except Arthropoda must find place in one volume, we ought, perhaps, to be thankful that some groups are not crowded out altogether. The Tunicata are not described in this volume, and hence will probably appear either before or among the lower invertebrates,—after all, their only proper position at the present stage of investigation. The volume closes with a full and very readable description of Mollusca.

The second volume treats of the Arthropoda. The Crustacea, Arachnoidea, and Myriapoda are described by Kingsley, who, however, gives the credit of most of the article on spiders to Emerton's book on that group. Three small orders appear under the Hexapoda, — the Dermaptera (earwigs), the Pseudoneuroptera, and the Aphaniptera. It is certainly still an open question whether entomologists have not studied differences more than affinities in making orders for the earwigs and the fleas. The lowest orders of insects are described by Packard, the Orthoptera by Riley, the Hemiptera by Uhler, the Coleoptera by Dimmock, the Diptera by Williston, the Aphaniptera by Kingsley, the Lepidoptera by Fernald (moths) and H. Edwards (butterflies), and the Hymenoptera by Howard and Comstock. This volume is almost purely systematic. Here (largely, we may believe, on account of the subdivision of the work and the lack of a complete understanding between the different writers) much important material has been omitted. Either under the general head of Hexapoda or the different orders, a general account of insect anatomy should have been given at length. The whole subject of metamorphosis is treated only in a most bare and meagre outline, and yet there is no topic of which we could rightly expect a more full and careful treatment. Of its necessity or advantage to the type or class, of its probable origin, of the different intermediate grades between the two main types, and of its bearing on the question concerning the ancestral form of insects, we find no notice. Throughout this volume we miss the broad deductions and generalizations which are so interesting and important to the common reader, and which are really the aim and goal of all scientific study.

If, too, the systematic study of insects is deemed the subject of greatest interest to the popular mind, the amateur student would have been greatly aided in determining his collections by tabular classifications of the families and genera. But while the reader will regret some things omitted in this volume, he will not fail to find in each section a description of the most important and interesting forms in each class and order. Each part is a thorough systematic monograph of its class.

The editors of the fifth volume had certain advantages over those of the first and second. The subject was naturally more interesting to the popular mind: it had been much more thoroughly worked by other writers, whose mistakes, at least, they could avoid. They had more space for carrying out their plans. The

class possessed a much higher degree of unity, and there were fewer editors. It will not, therefore, seem an invidious comparison if this volume, while perhaps no more accurate than the others, is pronounced the best in the general selection of material, and treatment of the subject. There is a fair amount of anatomy. The relations of the different orders and families are briefly but well noticed. It will be interesting reading for any one, and a valuable reference volume for the working zoölogist. The discussion of the origin and different races of the domesticated animals is in all cases full and good. This volume, of course, cannot treat so purely of American forms as some others, but our American mammals receive their fair share of attention. The systematic arrangement of the different orders, families, and genera, and the general basis of classification, are more sharply emphasized than in any preceding volume.

The point most noticeably worthy of criticism in the volume, and generally throughout the work, is the unnecessary profusion of plates and cuts. If the work were purely anatomical, they would be extremely useful, or even necessary. As it is, they add really only to the attractiveness of the work. The work is really one which all teachers should have, and which every student would find extremely useful; but it is too luxurious for those who need it most. May we not hope that the publisher will some time give us an edition not all too much condensed in the important subject-matter, but with fewer full-page plates, and generally less of the luxury usually so incompatible with the study of the working zoölogist?

MAXIMS OF PUBLIC HEALTH.

THIS book is addressed, not so much to health authorities as to the general reader. Dr. Wight has embodied in it, in a popular style, the results of several years of experience as the health-officer of two large western cities. No attempt is made at a systematic plan; the many subjects pertaining to public hygiene being presented mainly in the form of aphorisms, or detached paragraphs. Legal points with reference to nuisances, contagious diseases, and offensive trades, are introduced; the rights of citizens concerning sanitary matters are clearly and concisely set forth; and important decisions bearing upon them are cited.

Maxims of public health. By O. W. WIGHT, A.M., M.D., health-officer of Detroit. New York, Appleton, 1884. 176 p. 12^o.